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09854349 ZA
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CD(s) containing:

computer program listing

Doc Code: Computer

pages of specification

and/or sequence listing

and/or table

Doc Code: Artifact

content unspecified or combined

Doc Code: Artifact

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Artifact Type Code: P

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Artifact Type Code: S

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Artifact Type Code: U

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Stapled Set(s) Color Documents or B/W Photographs

Doc Code: Artifact Artifact Type Code: C

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Microfilm(s)

Doc Code: Artifact Artifact Type Code: F

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Video tape(s)

Doc Code: Artifact Artifact Type Code: V

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Model(s)

Doc Code: Artifact Artifact Type Code: M

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Bound Document(s)

Doc Code: Artifact Artifact Type Code: B

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Doc Code: Artifact Artifact Type Code X

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Other, description:

Doc Code: Artifact

U.S. Priority Document
Artifact Type Code: Z



150045-DV

The United States of America



The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

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Therefore, this

Technology Center 2600

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.

T. Todd Johnson

Commissioner of Patents and Trademarks

Allie M. Person
Attest



US005903260A

United States Patent [19]

Imamura

[11] Patent Number: 5,903,260

[45] Date of Patent: May 11, 1999

[54] FLAT PANEL DEVICE AND DISPLAY DRIVER
WITH ON/OFF POWER CONTROLLER
USED TO PREVENT DAMAGE TO THE LCD

[75] Inventor: Youichi Imamura, Suwa, Japan

[73] Assignee: Seiko Epson Corporation, Tokyo,
Japan

[21] Appl. No.: 08/582,771

[22] Filed: Jan. 2, 1996

Related U.S. Application Data

[62] Division of application No. 08/267,103, Jun. 23, 1994, Pat. No. 5,563,624, which is a continuation of application No. 07/834,295, Apr. 9, 1992, abandoned, filed as application No. PCT/JP91/00785, Jun. 11, 1991.

[30] Foreign Application Priority Data

Jun. 18, 1990 [JP] Japan JP159416/90
Jun. 11, 1991 [WO] WIPO PCT/JP91/00785

[51] Int. Cl.⁶ G09G 5/00; G05B 11/01

[52] U.S. Cl. 345/211; 364/141

[58] Field of Search 345/87, 98, 99,
345/100, 117, 204, 205, 206, 211, 212,
213; 315/169.4; 363/86; 340/825.5; 395/750.01,
750.04, 750.07, 700.08; 364/140, 141, 142,
143, 144

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Primary Examiner—Jeffery Brier

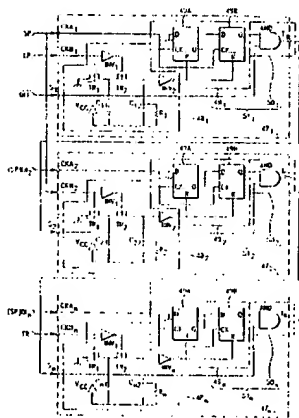
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[57] ABSTRACT

Signal management control units 47₁–47_n of respective scan drivers LSI in an LCD module are cascade-connected and each have the same construction. A detected signal of the signal management control unit 47₁ is a data signal latch clock LP applied to a terminal CKB₁. A detected signal of the signal management control unit 47₂ is a frame start signal SP applied to a terminal CKB₂. A detected signal of the signal management control unit 47_n is an AC-transforming clock FR applied to a terminal CKB_n. The signal management control unit 47₁ includes a signal stop detection circuit 48 serving as a signal detection means for detecting a stop of the detected signal and a sequence processing circuit 51 consisting of a signal delay circuit 49 and a logic circuit 50. When stopping oscillations of, e. g., the frame start signal SP, outputs T₁–T_n of the circuit 51 change to an L level. Hence, a display-off signal DF of the LCD module assumes the L level. A liquid crystal panel is forcibly set in a display-off mode. As a result, even if the frame start signal SP is stopped due to some cause, a liquid crystal application voltage is set down to zero. It is, therefore, possible to avoid a liquid crystal DC drive and prevent a deterioration of the liquid crystal.

6 Claims, 9 Drawing Sheets



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